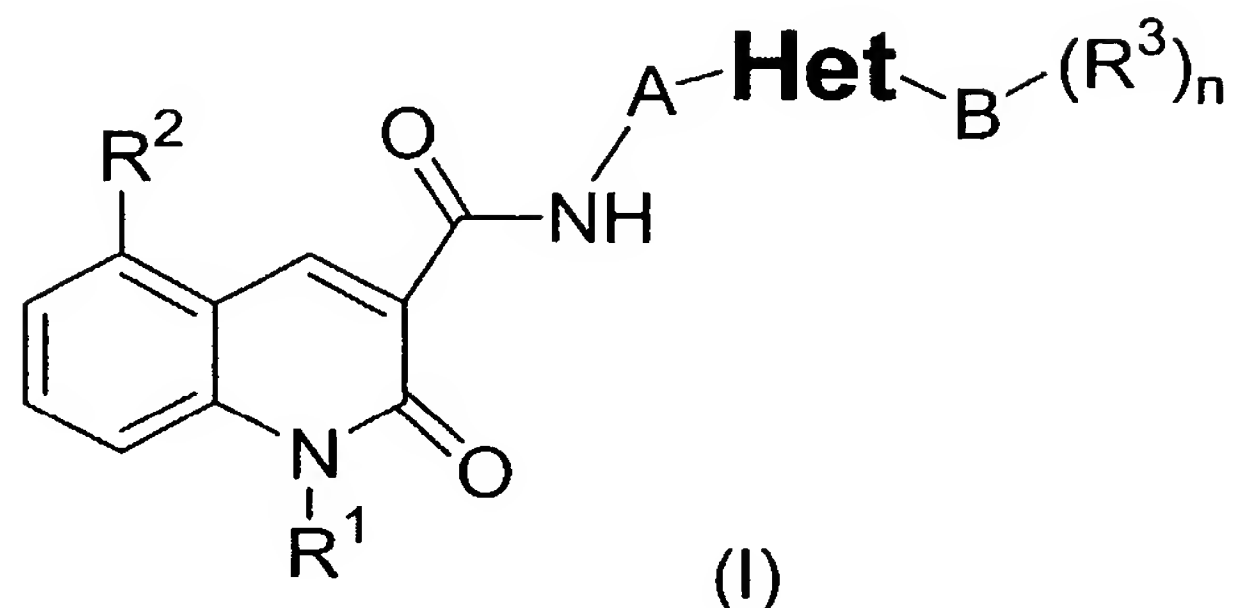


CLAIMS

1. A compound of the formula (I):



wherein

5 **Het** represents a heterocyclic group having one nitrogen atom, to which B binds directly, and from 4 to 7 carbon atoms, and said heterocyclic group being unsubstituted or substituted by 1 to 4 substituents independently selected from the group consisting of substituents α^1 ;

A represents an alkylene group having from 1 to 4 carbon atoms;

10 **B** represents a covalent bond or an alkylene group having from 1 to 5 carbon atoms;

R¹ represents an isopropyl group, a n-propyl group or a cyclopentyl group;

R² represents a methyl group, a fluorine atom or a chlorine atom;

R³ independently represents

15 (i) an oxo group, a hydroxy group, an amino group, an alkylamino group or a carboxyl group;

(ii) a cycloalkyl group having from 3 to 8 carbon atoms, and said cycloalkyl group being substituted by 1 to 5 substituents independently selected from the group consisting of substituents α^2 , or

20 (iii) a heterocyclic group having from 3 to 8 atoms, and said heterocyclic group being unsubstituted or substituted by 1 to 5 substituents independently selected from the group consisting of substituents β ,

said substituents α^1 are independently selected from a hydroxy group and an amino group;

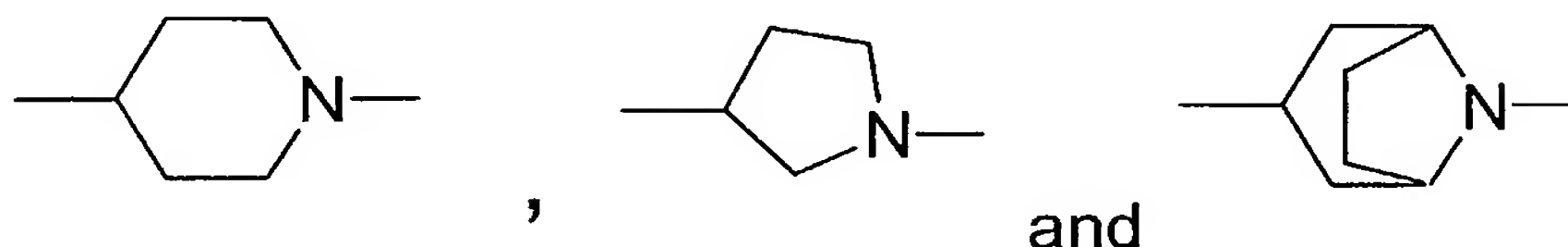
25 said substituents α^2 are independently selected from a hydroxy group, an amino group, a hydroxy-substituted alkyl group having from 1 to 4 carbon atoms, a carboxyl group and an alkoxy group having from 1 to 4 carbon atoms; and

said substituents β are selected from a hydroxy group, a hydroxy-substituted alkyl

group having from 1 to 4 carbon atoms, a carboxyl group, an amino group, an alkyl group having from 1 to 4 carbon atoms, an amino-substituted alkyl group having from 1 to 4 carbon atoms and a carbamoyl group; and **n** is 1, 2 or 3, or a pharmaceutically acceptable salts thereof.

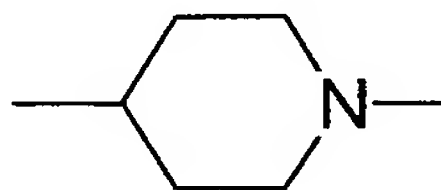
5

2. The compound or its pharmaceutically acceptable salt of Claim 1, wherein **Het** represents a heterocyclic group selected from



10 said heterocyclic group being unsubstituted or substituted by 1 to 3 substituents independently selected from the group consisting of substituents α^1 .

3. The compound or its pharmaceutically acceptable salt of Claim 1, wherein



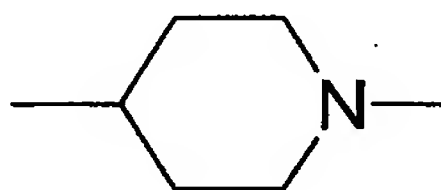
Het represents a group of formula

15 and this group being unsubstituted or substituted by one substituent selected from the group consisting of substituents α^1 ;

A represents an alkylene group having from 1 to 3 carbon atoms; and

R¹ represents an isopropyl group or a cyclopentyl group.

4. The compound or its pharmaceutically acceptable salt of Claim 1, wherein



20 **Het** represents a group of formula

A represents an alkylene group having from 1 to 2 carbon atoms;

B represents an alkylene group having from 1 to 5 carbon atoms;

R³ independently represents

25 (i) an oxo group, a hydroxy group, an amino group, an alkylamino group or a carboxyl group;

(ii) a cycloalkyl group having from 5 to 7 carbon atoms, and said cycloalkyl group being substituted by 1 to 3 substituents independently selected from

- the group consisting of substituents α^2 , or
- (iii) a heterocyclic group having from 5 to 7 atoms, and said heterocyclic group being unsubstituted or substituted by 1 to 3 substituents independently selected from the group consisting of substituents β ,
- 5 **said substituents α^2** are independently selected from a hydroxy group, an amino group, a hydroxy-substituted alkyl group having from 1 to 4 carbon atoms, a carboxyl group and an alkoxy group having from 1 to 4 carbon atoms; and
- said substituents β** are selected from a hydroxy group, a hydroxy-substituted alkyl group having from 1 to 4 carbon atoms, a carboxyl group, an amino group, an alkyl
- 10 group having from 1 to 4 carbon atoms, an amino-substituted alkyl group having from 1 to 4 carbon atoms and a carbamoyl group; and **n** is 1, 2, or 3.

5. The compound or its pharmaceutically acceptable salt of Claim 1, wherein
- A** represents a methylene group;
- 15 **B** represents an alkylene group having from 1 to 5 carbon atoms;
- R¹** represents an isopropyl group;
- R³** independently represents
- (i) an oxo group or a hydroxy group;
- (ii) a cycloalkyl group having from 5 to 6 carbon atoms, and said cycloalkyl
- 20 group being substituted by 1 to 2 substituents independently selected from the group consisting of substituents α^2 , or
- (iii) a heterocyclic group having from 5 to 6 atoms, and said heterocyclic group being unsubstituted or substituted by 1 to 2 substituents independently selected from the group consisting of substituents β ,
- 25 **said substituents α^2** are independently selected from a hydroxy group or an amino group; and
- said substituents β** are selected from a hydroxy group, an amino group and an alkyl group having from 1 to 4 carbon atoms group; and **n** is 1 or 2.
- 30 6. The compound or its pharmaceutically acceptable salt of Claim 1, wherein
- B** represents an alkylene group having from 1 to 3 carbon atoms;
- R³** independently represents

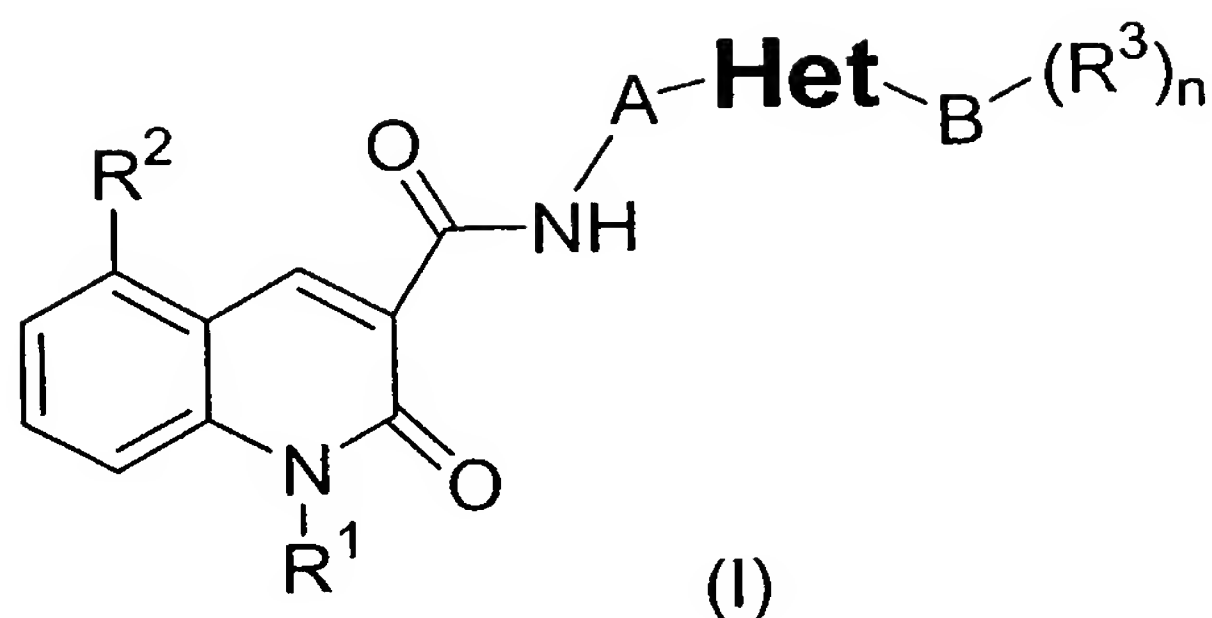
- (i) an oxo group or a hydroxy group;
 (ii) a cyclohexyl group substituted by 1 to 2 hydroxy group, or
 (iii) a heterocyclic group selected from a hydroxytetrahydropyranyl, piperidinyl and morpholinyl, and said heterocyclic group being unsubstituted or substituted by 1 to 2 substituents independently selected from a hydroxy group and a methyl group; and **n** is 1 or 2.

7. The compound or its pharmaceutically acceptable salt of Claim 6, wherein **B** represents a methylene group;
 10 **R**² represents a methyl group;
R³ independently represents a 1, 4 dihydroxycyclohexyl group, a hydroxytetrahydropyranyl, piperidinyl and morpholinyl; and **n** is 1.

8. The compound or its pharmaceutically acceptable salt of Claim 7, wherein
 15 **R**³ independently represents a 1, 4 dihydroxycyclohexyl group or a hydroxytetrahydropyranyl.

9. The compound of Claim 1 which is
 20 *N*-({1-[(*cis*-1,4-dihydroxycyclohexyl)methyl]piperidin-4-yl}methyl)-1-isoprppyl-5-methyl-2-oxo-1,2-dihydroquinoline-3-carboxamide ethanedioate;
N-({1-[(*trans*-1,4-dihydroxycyclohexyl)methyl]piperidin-4-yl}methyl)-1-isoprppyl-5-methyl-2-oxo-1,2-dihydroquinoline-3-carboxamide ethanedioate, or a pharmaceutically acceptable salt thereof.

25 10. A pharmaceutical composition for the treatment of diseases selected from gastroesophageal reflux disease, gastrointestinal disease, gastric motility disorder, non-ulcer dyspepsia, functional dyspepsia, irritable bowel syndrome (IBS), constipation, dyspepsia, esophagitis, gastroesophageal disease, nausea, central nervous system disease, Alzheimer's disease, cognitive disorder, emesis, migraine,
 30 neurological disease, pain, and cardiovascular disorders such as cardiac failure and heart arrhythmia, diabetes, apnea syndrome, postoperative bowel motility, which comprises a therapeutically effective amount of a compound of the formula (I):



wherein

Het represents a heterocyclic group having one nitrogen atom, to which B binds directly, and from 4 to 7 carbon atoms, and said heterocyclic group being
 5 unsubstituted or substituted by 1 to 4 substituents independently selected from the group consisting of substituents α^1 ;

A represents an alkylene group having from 1 to 4 carbon atoms;

B represents a covalent bond or an alkylene group having from 1 to 5 carbon atoms;

R¹ represents an isopropyl group, a n-propyl group or a cyclopentyl group;

10 **R²** represents a methyl group, a fluorine atom or a chlorine atom;

R³ independently represents

- (i) an oxo group, a hydroxy group, an amino group, an alkylamino group or a carboxyl group;
- (ii) a cycloalkyl group having from 3 to 8 carbon atoms, and said cycloalkyl
 15 group being substituted by 1 to 5 substituents independently selected from the group consisting of substituents α^2 , or
- (iii) a heterocyclic group having from 3 to 8 atoms, and said heterocyclic group being unsubstituted or substituted by 1 to 5 substituents independently selected from the group consisting of substituents β ,

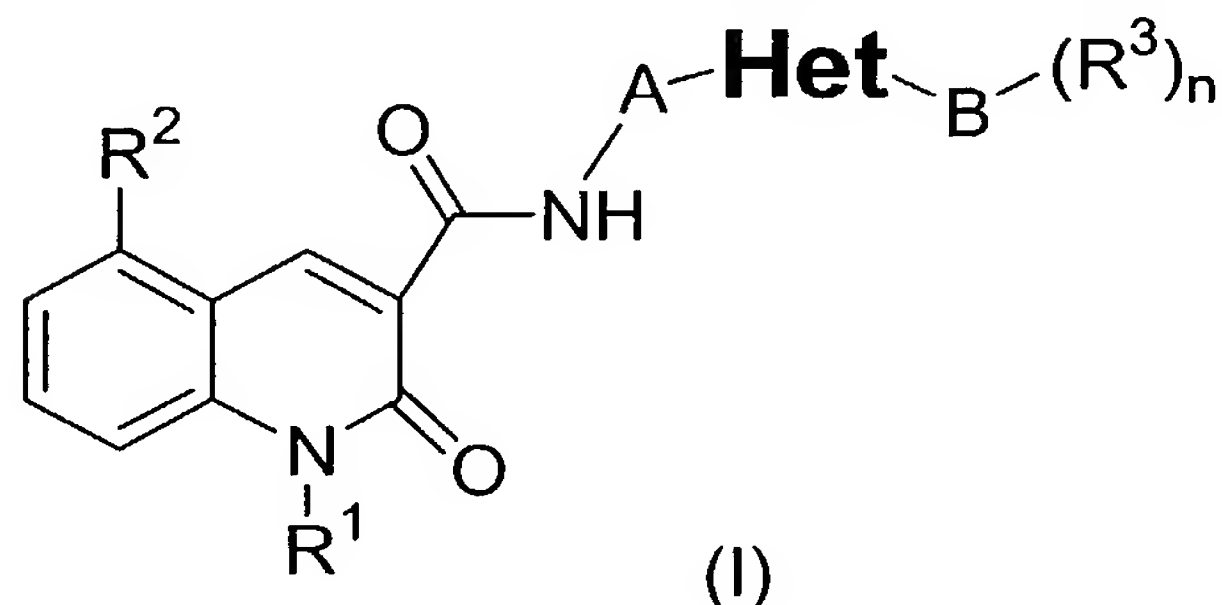
20 **said substituents α^1** are independently selected from a hydroxy group and an amino group;

said substituents α^2 are independently selected from a hydroxy group, an amino group, a hydroxy-substituted alkyl group having from 1 to 4 carbon atoms, a carboxyl group and an alkoxy group having from 1 to 4 carbon atoms; and

25 **said substituents β** are selected from a hydroxy group, a hydroxy-substituted alkyl group having from 1 to 4 carbon atoms, a carboxyl group, an amino group, an alkyl group having from 1 to 4 carbon atoms, an amino-substituted alkyl group having from

1 to 4 carbon atoms and a carbamoyl group; and **n** is 1, 2 or 3,
or a pharmaceutically acceptable salts thereof..

11. A method for the treatment of disease conditions mediated by 5-HT₄ receptor
activity, in a mammalian subject, which comprises administering to said subject a



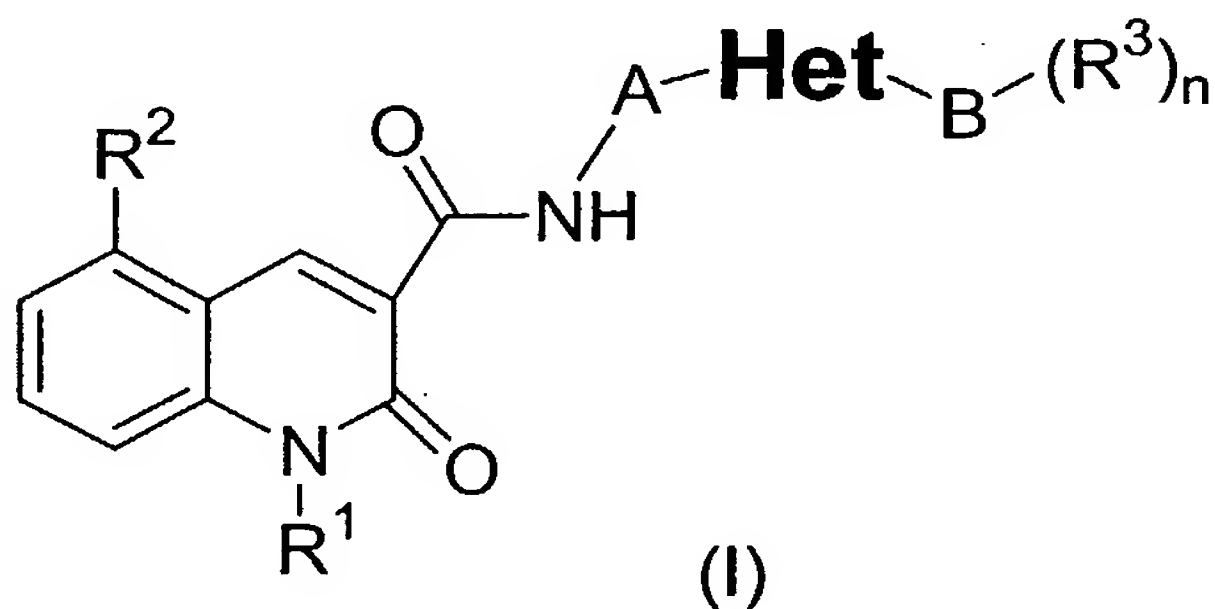
wherein

- Het** represents a heterocyclic group having one nitrogen atom, to which B binds directly, and from 4 to 7 carbon atoms, and said heterocyclic group being
unsubstituted or substituted by 1 to 4 substituents independently selected from the
group consisting of substituents α^1 ;
- A** represents an alkylene group having from 1 to 4 carbon atoms;
- B** represents a covalent bond or an alkylene group having from 1 to 5 carbon atoms;
- R¹** represents an isopropyl group, a n-propyl group or a cyclopentyl group;
- R²** represents a methyl group, a fluorine atom or a chlorine atom;
- R³** independently represents
- (i) an oxo group, a hydroxy group, an amino group, an alkylamino group or a carboxyl group;
 - (ii) a cycloalkyl group having from 3 to 8 carbon atoms, and said cycloalkyl group being substituted by 1 to 5 substituents independently selected from the group consisting of substituents α^2 , or
 - (iii) a heterocyclic group having from 3 to 8 atoms, and said heterocyclic group being unsubstituted or substituted by 1 to 5 substituents independently selected from the group consisting of substituents β ,
- said substituents α^1 are independently selected from a hydroxy group and an amino group;
- said substituents α^2 are independently selected from a hydroxy group, an amino

group, a hydroxy-substituted alkyl group having from 1 to 4 carbon atoms, a carboxyl group and an alkoxy group having from 1 to 4 carbon atoms; and

said substituents β are selected from a hydroxy group, a hydroxy-substituted alkyl group having from 1 to 4 carbon atoms, a carboxyl group, an amino group, an alkyl group having from 1 to 4 carbon atoms, an amino-substituted alkyl group having from 1 to 4 carbon atoms and a carbamoyl group; and **n** is 1, 2 or 3, or a pharmaceutically acceptable salts thereof.

12. A method for the treatment of diseases selected from gastroesophageal reflux disease, gastrointestinal disease, gastric motility disorder, non-ulcer dyspepsia, functional dyspepsia, irritable bowel syndrome (IBS), constipation, dyspepsia, esophagitis, gastroesophageal disease, nausea, central nervous system disease, Alzheimer's disease, cognitive disorder, emesis, migraine, neurological disease, pain, and cardiovascular disorders such as cardiac failure and heart arrhythmia, diabetes, apnea syndrome, and postoperative bowel motility, which comprises administering to said subject a therapeutically effective amount of a compound of the formula (I):



wherein

Het represents a heterocyclic group having one nitrogen atom, to which B binds directly, and from 4 to 7 carbon atoms, and said heterocyclic group being unsubstituted or substituted by 1 to 4 substituents independently selected from the group consisting of substituents α^1 ;

A represents an alkylene group having from 1 to 4 carbon atoms;

B represents a covalent bond or an alkylene group having from 1 to 5 carbon atoms;

R¹ represents an isopropyl group, a n-propyl group or a cyclopentyl group;

R² represents a methyl group, a fluorine atom or a chlorine atom;

R³ independently represents

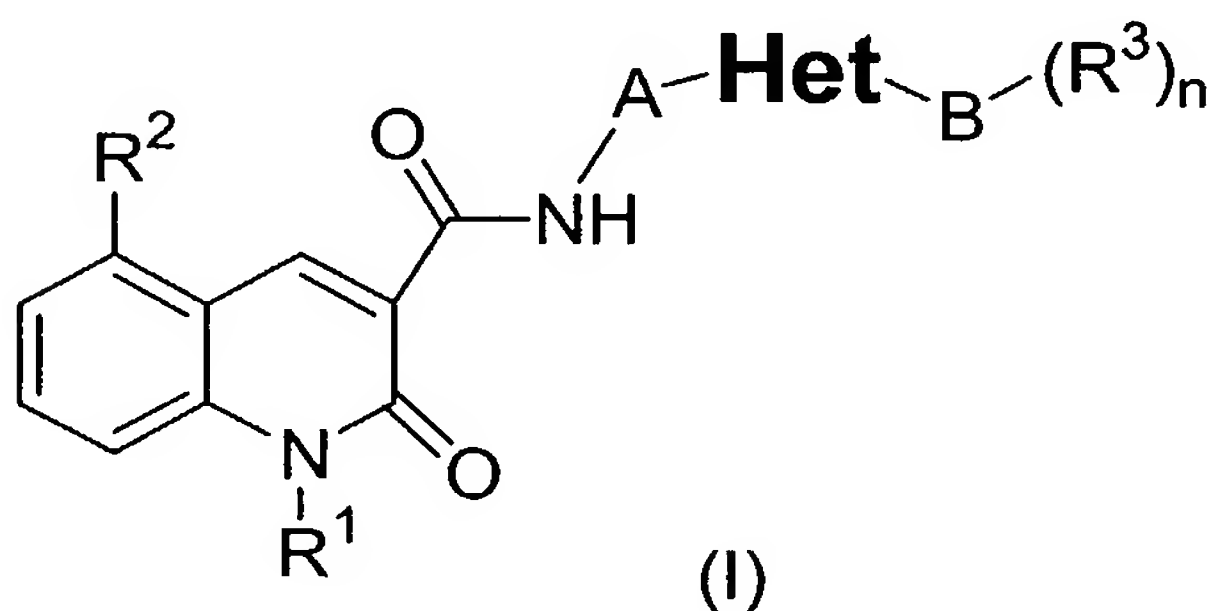
- (i) an oxo group, a hydroxy group, an amino group, an alkylamino group or a carboxyl group;
- (ii) a cycloalkyl group having from 3 to 8 carbon atoms, and said cycloalkyl group being substituted by 1 to 5 substituents independently selected from the group consisting of substituents α^2 , or
- (iii) a heterocyclic group having from 3 to 8 atoms, and said heterocyclic group being unsubstituted or substituted by 1 to 5 substituents independently selected from the group consisting of substituents β ,

said substituents α^1 are independently selected from a hydroxy group and an amino group;

said substituents α^2 are independently selected from a hydroxy group, an amino group, a hydroxy-substituted alkyl group having from 1 to 4 carbon atoms, a carboxyl group and an alkoxy group having from 1 to 4 carbon atoms; and

said substituents β are selected from a hydroxy group, a hydroxy-substituted alkyl group having from 1 to 4 carbon atoms, a carboxyl group, an amino group, an alkyl group having from 1 to 4 carbon atoms, an amino-substituted alkyl group having from 1 to 4 carbon atoms and a carbamoyl group; and n is 1, 2 or 3, or a pharmaceutically acceptable salts thereof.

13. Use of a compound of the formula (I):



wherein

Het represents a heterocyclic group having one nitrogen atom, to which B binds directly, and from 4 to 7 carbon atoms, and said heterocyclic group being unsubstituted or substituted by 1 to 4 substituents independently selected from the group consisting of substituents α^1 ;

A represents an alkylene group having from 1 to 4 carbon atoms;

B represents a covalent bond or an alkylene group having from 1 to 5 carbon atoms;

R¹ represents an isopropyl group, a n-propyl group or a cyclopentyl group;

R² represents a methyl group, a fluorine atom or a chlorine atom;

R³ independently represents

- 5 (i) an oxo group, a hydroxy group, an amino group, an alkylamino group or a
 carboxyl group;
- (ii) a cycloalkyl group having from 3 to 8 carbon atoms, and said cycloalkyl
 group being substituted by 1 to 5 substituents independently selected from
 the group consisting of substituents α^2 , or
- 10 (iii) a heterocyclic group having from 3 to 8 atoms, and said heterocyclic group
 being unsubstituted or substituted by 1 to 5 substituents independently
 selected from the group consisting of substituents β ,

said substituents α^1 are independently selected from a hydroxy group and an amino group;

- 15 **said substituents α^2** are independently selected from a hydroxy group, an amino
 group, a hydroxy-substituted alkyl group having from 1 to 4 carbon atoms, a carboxyl
 group and an alkoxy group having from 1 to 4 carbon atoms; and

- said substituents β** are selected from a hydroxy group, a hydroxy-substituted alkyl
 group having from 1 to 4 carbon atoms, a carboxyl group, an amino group, an alkyl
20 group having from 1 to 4 carbon atoms, an amino-substituted alkyl group having from
 1 to 4 carbon atoms and a carbamoyl group; and **n** is 1, 2 or 3,
 or a pharmaceutically acceptable salts thereof,

 in the manufacture of a medicament for the treatment of disease conditions mediated
 by 5-HT₄ receptor activity and/or 5-HT₃ activity, in a mammalian subject.

- 25 14. Use of a compound according to Claim 13, wherein said condition is selected
 from gastroesophageal reflux disease, gastrointestinal disease, gastric motility
 disorder, non-ulcer dyspepsia, functional dyspepsia, irritable bowel syndrome (IBS),
 constipation, dyspepsia, esophagitis, gastroesophageal disease, nausea, central
 nervous system disease, Alzheimer's disease, cognitive disorder, emesis, migraine,
30 neurological disease, pain, and cardiovascular disorders such as cardiac failure and
 heart arrhythmia, diabetes and apnea syndrome, and postoperative bowel motility.